

WESTPORT SLOUGH SEDIMENT EVALUATION

Introduction

1. The Westport Slough is located on the Oregon side of the Columbia River at about river mile 43.5. As originally authorized by the River and Harbor Act of 26 August 1937, the project provided for a channel 28 feet deep, 200 feet wide and about 3,500 feet long, extending from the entrance in the Columbia river, upstream to the ferry dolphin just below the lumber dock at Westport (see Attachment 1). The last dredging took place in 1966 when 67,238 cubic yards was dredged to maintain the channel at a 30 foot depth.

2. The Westport Ferry proceeds down the slough channel then across the Columbia River to connect Westport to the south side of Puget Island on the Washington side of the Columbia River. Recently, the Ferry has been experiencing difficulty in traversing the mouth of the slough because of shoaling, possibly caused by redeposition of dredge spoil, used as beach nourishment, from the upstream bank of the Columbia River.

Physical Results

3. Because of this shoaling at the mouth of the Westport Slough, OP-NW requested sediment samples be taken and analyzed prior to possible dredging. Four samples were taken by vibracore on 10 May 1990. Sample cores ranged from 1.8 to 3.6 feet in length. Physical analysis of the samples revealed that the sediments contained a high amount of fine grained material - 39.4 to 73.5 percent fines (see Attachment 2). Fines are defined as particles with a grain size diameter of less than or equal to 0.074 millimeter. Two samples (CR-VC-9 & 10), taken near the edge of the slough channel, were lower in fines - mean fines 39.6 percent. The two samples (CR-VC-11,12A bottom & 12A top) taken near the center of the slough channel were higher in fines content - 72.1 percent.

4. A high fines content could indicate possible contamination since organic contaminants such as pesticides, PCBs and PAHs, and heavy metals tend to adsorb to small particles in the sediment. However, as the results below will show, the organic content and the level of chemical contaminants in these sediment samples were very low and below CENPP concern levels. The sediment is predominantly silty material.

5. A gross measure of the organic content of a sample is the

amount of volatile solids contained in the sample. The volatile solids content of the samples followed the same pattern as the fines with the samples near the edge of the slough channel showing a volatile solids of 0.5 percent while the mid channel samples averaged 1.4 percent. The fraction of the volatile solids attributable to organic carbon is measured as the Total Organic Carbon (TOC). A TOC of 0.84 percent was measured in one composited sample (12A bottom & 12B top). These values for volatile solids and TOC are below CENPP concern levels (< 5% volatile solids) and indicate that the sediment is made up of fine sand and silt having a low organic content.

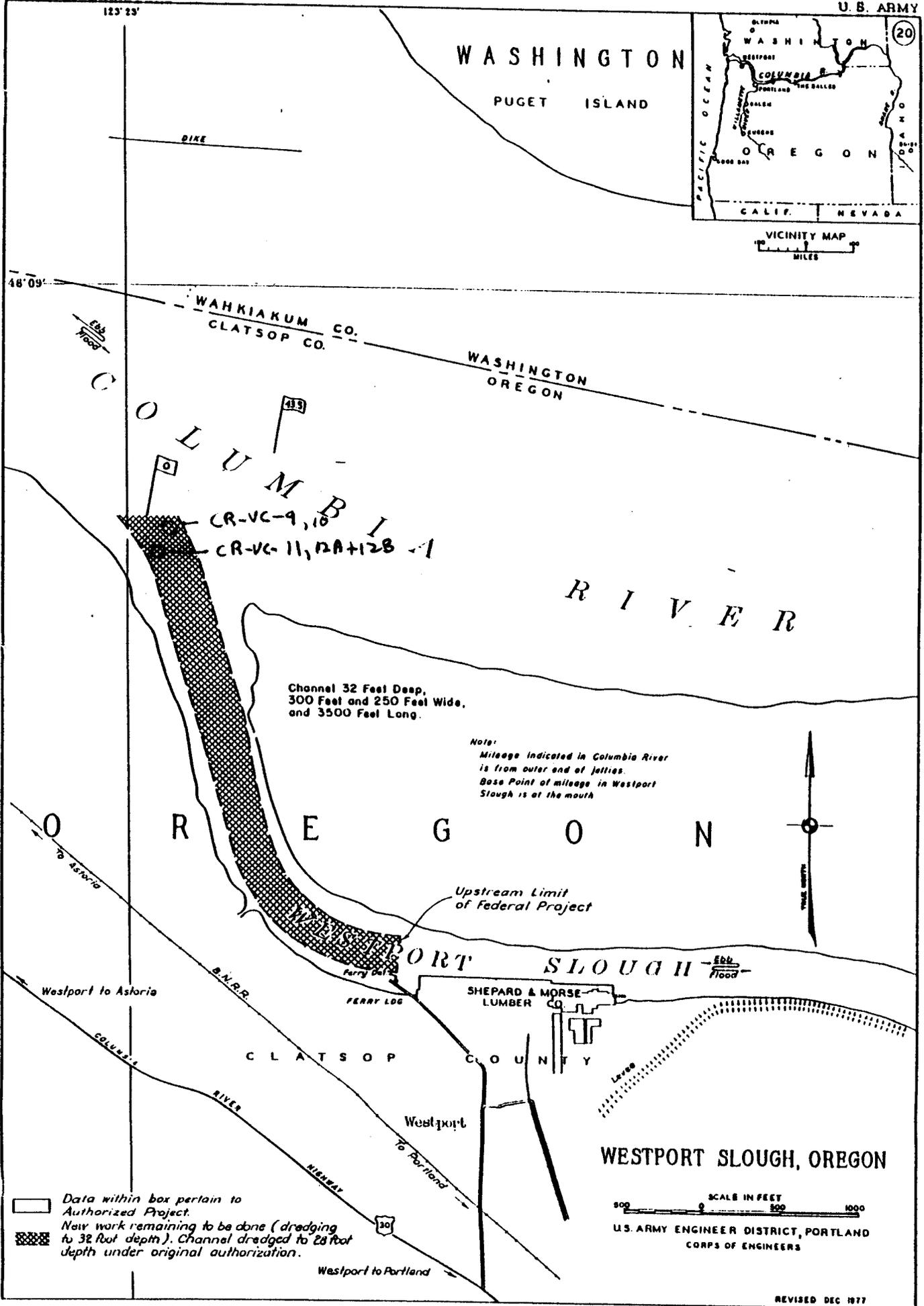
Chemical Results

6. The four samples were composited into two samples for chemical analysis as follows: composite #1 (CR-VC-9 & 10); composite #2 (CR-VC-11, 12A bottom & 12B top). The composites were analyzed for metals, PAHs, Pesticides and PCBs by Battelle, Pacific Northwest Division, Sequim, Washington. The results of the chemical analyses are shown in Table 1. The raw data are in attachment 2. The results are typical of uncontaminated sediment. Chemical analyses revealed no unusual elevations of heavy metals. Pesticides, PCBs and PAHs were undetected and, according to CENPP Tiered Testing Guidelines, there is no reason for concern about potential chemical contamination in the sediment (Table 1.). There is no known source of contamination upstream in the area. The lack of chemical contamination and small volume of material to be dredged from the mouth of the slough should qualify the material for in-water disposal. To minimize environmental impacts the material should be disposed between salmon runs in winter, when there is a high sediment load in the river already or, between runs in summer.

7. Composite #2 was analyzed for dioxins and furans because of the fine-grained nature of the sediment and its closeness to the outfall of the James River paper mill at Wauna which is 2.0 miles downstream from the outlet of the Westport Slough. It is possible that tidal influences could bring contaminant material back upstream to the slough outlet. The most toxic dioxin, 2,3,7,8-TCDD, was not detected (detection limit 0.42 ng/kg). The furan, 2,3,7,8-TCDF which is considered to be one tenth as toxic as 2,3,7,8-TCDD was detected at 0.89 ng/kg. Concern levels for dioxin/furan congeners have not yet been established by the Pacific Division of Corps of Engineers. However, the levels measured for these two congeners are at or near the detection limits of the method and are probably not of concern.

District 5014192
8. If you have questions regarding this sediment evaluation please contact Jim Britton at extension 6465.

ATTACHMENT 1.



Data within box pertain to Authorized Project.
 New work remaining to be done (dredging to 32 foot depth). Channel dredged to 28 foot depth under original authorization.

WESTPORT SLOUGH, OREGON

SCALES IN FEET
0 500 1000

U. S. ARMY ENGINEER DISTRICT, PORTLAND
CORPS OF ENGINEERS

TABLE 1.

Summary of Results of Chemical Analyses

Analysis	Mean* (N=2)	CENPP Concern Level
(ppm)		
Metals		
As	2.20	40
Cd	0.19	1.0
Cr	7.3	20-300
Cu	19.1	50
Pb	2.57	40
Hg	<0.03	0.15
Ni	7.5	-
Ag	<0.3	1.0
Zn	38.1	250
(ppb)		
Pesticides	N.D.	15-20
PCBs	N.D.	400-500
PAHs	N.D.	1,500-2,000 (total)

* Raw data is in Attachment 2. Mean is of two composites: composite #1 (CR-VC-9 & 10); composite 2 (CR-VC-11, 12A top & 12B bottom).

N.D. = none detected

ATTACHMENT 2.

Core = 2.4'

*** Corps of Engineers - North Pacific Division Materials Laboratory ***

COLUMBIA/LOWER WILLAMETTE-RECON/O&M (90-SHM-186)

Boring: CR-VC Sample: 9 Depth: -- Lab No.: 18606

Sieve Analysis Cumulative

Sieve	Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	119.00	0.0
No. 18	0.00	100.0
No. 35	0.00	100.0
No. 60	0.20	99.8
No. 120	16.90	85.8
No. 230	90.10	24.3
Pan	119.00	0.0

Hydrometer Analysis

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	19.0	0.0487	16.2
3	20.0	8.2	0.0299	7.2
10	20.0	4.7	0.0167	4.3
100	20.0	2.3	0.0069	2.3
200	20.0	2.3	0.0049	2.3

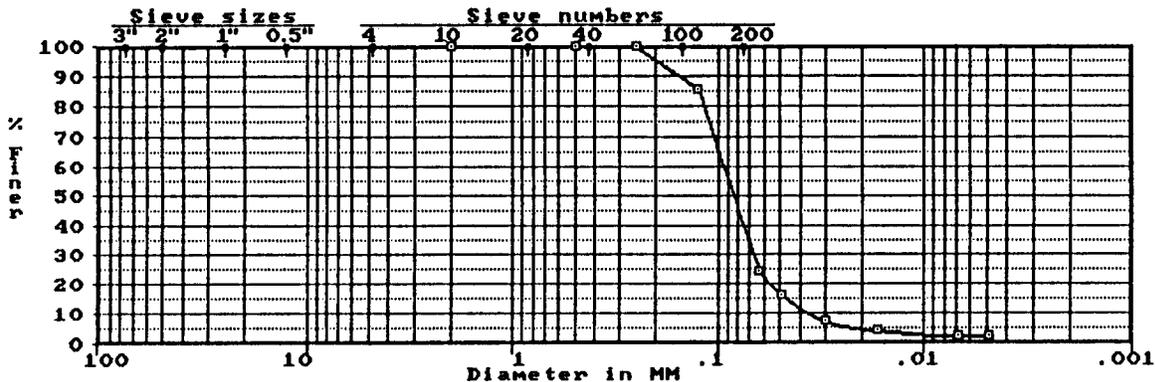
D85: 0.12 D60: .094 D50: .085 D30: .067 D15: .046 D10: .036 mm

Cu: 2.59 Cc: 1.32

Gravel: 0.0% Sand: 60.6% Fines: 39.4%

Comments

- VIBRA CORE SAMPLE TAKEN 4-10-90
 - VOLATILE SOLIDS = 0.5%
- Cannot classify soil without knowing type of fines.



core = 1.8'

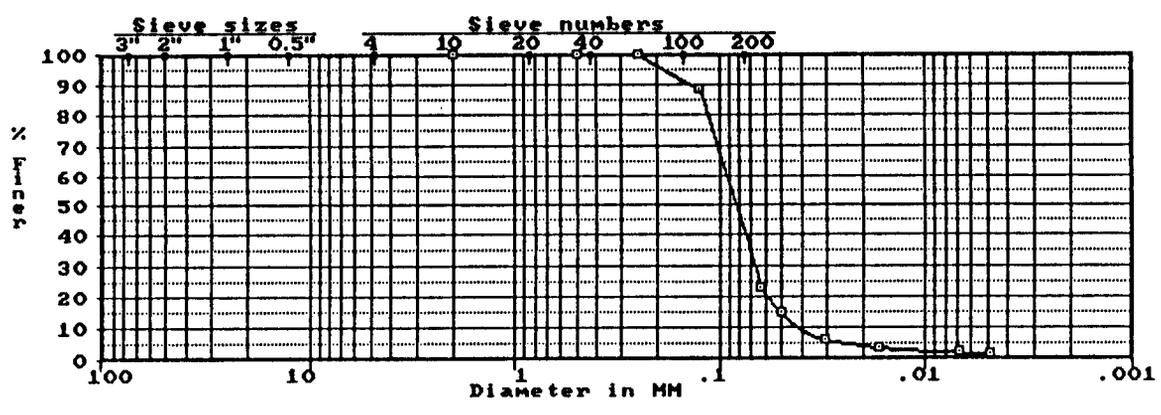
*** Corps of Engineers - North Pacific Division Materials Laboratory ***
 COLUMBIA/LOWER WILLAMETTE-RECON/O&M (90-SHM-186)
 Boring: CR-VC Sample: 10 Depth: -- Lab No.: 18607

Sieve Analysis			Hydrometer Analysis				
Cumulative			Sample Weight: 85.1 gr.	Start Time: 0000			
Sieve	Grams Retained	Percent Passing	Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
5 In.	0.00	100.0	1	20.0	12.2	0.0507	14.8
2.5 In.	0.00	100.0	3	20.0	4.7	0.0305	6.0
1.25 In.	0.00	100.0	10	20.0	2.7	0.0169	3.7
5/8 In.	0.00	100.0	100	20.0	1.4	0.0069	2.2
5/16 In.	0.00	100.0	200	20.0	0.9	0.0049	1.6
No. 5	0.00	100.0					
No. 10	0.00	100.0					
Pan	85.10	0.0					
No. 18	0.00	100.0					
No. 35	0.00	100.0					
No. 60	0.20	99.8					
No. 120	9.80	88.5					
No. 230	65.30	23.3					
Pan	85.10	0.0					

D85: 0.12 D60: .093 D50: .084 D30: .068 D15: .051 D10: .041 mm
 Cu: 2.24 Cc: 1.19
 Gravel: 0.0% Sand: 60.3% Fines: 39.7%

Comments

- VIBRA CORE SAMPLE TAKEN 4-10-90
 - VOLATILE SOLIDS - 0.5%
- Cannot classify soil without knowing type of fines.



Core = 2.5'

*** Corps of Engineers - North Pacific Division Materials Laboratory ***
 COLUMBIA/LOWER WILLAMETTE-RECON/O&M (90-SHM-186)

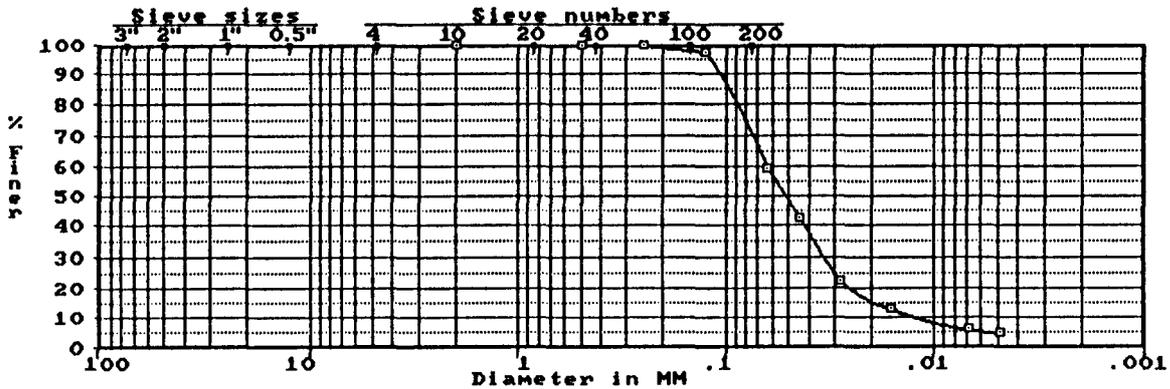
Boring: CR-VC Sample: 11 Depth: -- Lab No.: 18608

Sieve Analysis			Hydrometer Analysis				
Cumulative			Sample Weight: 81.5 gr.	Start Time: 0000			
Sieve	Grams Retained	Percent Passing	Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
5 In.	0.00	100.0	1	20.0	34.2	0.0438	42.2
2.5 In.	0.00	100.0	3	20.0	18.2	0.0282	22.7
1.25 In.	0.00	100.0	10	20.0	10.2	0.0162	13.0
5/8 In.	0.00	100.0	100	20.0	4.4	0.0068	6.0
5/16 In.	0.00	100.0	200	20.0	3.4	0.0049	4.7
No. 5	0.00	100.0					
No. 10	0.00	100.0					
Pan	81.50	0.0					
No. 18	0.00	100.0					
No. 35	0.00	100.0					
No. 60	0.10	99.9					
No. 120	2.00	97.5					
No. 230	32.90	59.6					
Pan	81.50	0.0					

D85: .097 D60: .063 D50: .052 D30: .034 D15: .019 D10: .012 mm
 Cu: 5.12 Cc: 1.46
 Gravel: 0.0% Sand: 29.4% Fines: 70.6%

Comments

- VIBRA CORE SAMPLE TAKEN 4-10-90
 - VOLATILE SOLIDS = 1.4%
- Cannot classify soil without knowing type of fines.



10' core = 1.0'

*** Corps of Engineers - North Pacific Division Materials Laboratory ***

COLUMBIA/LOWER WILLAMETTE-RECON/O&M (90-SHM-186)

Boring: CR-VC Sample: 12A Depth: -- Lab No.: 18609

Sieve Analysis

Hydrometer Analysis

Sieve	Cumulative Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	95.80	0.0
No. 18	0.00	100.0
No. 35	0.00	100.0
No. 60	0.00	100.0
No. 120	0.50	99.5
No. 230	13.20	86.2
Pan	95.80	0.0

Sample Weight	Temp (C)	Hydrometer Reading	Diameter in mm	Start Time	Percent Finer
95.8 gr.	20.0	54.2	0.0365	0000	56.5
	20.0	37.2	0.0247		39.0
	20.0	21.7	0.0151		22.9
	20.0	9.4	0.0066		10.2
	20.0	6.9	0.0048		7.6

10' 3.6'

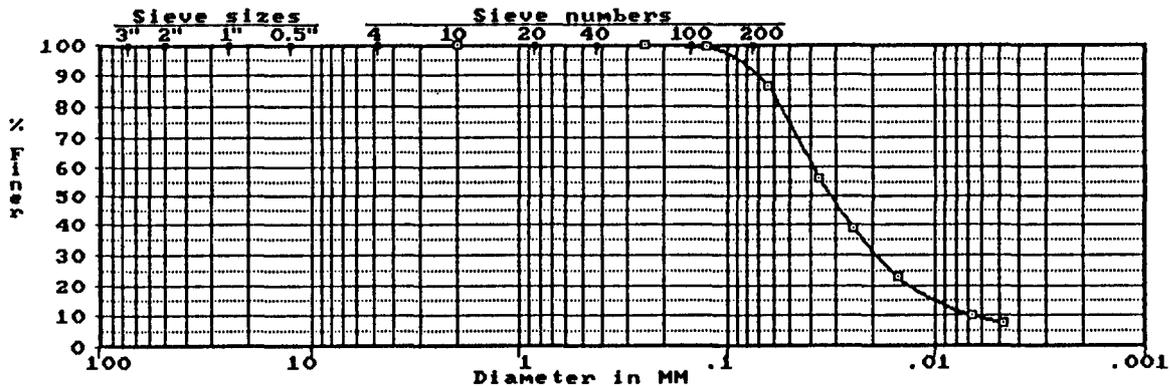
D85: .061 D60: .039 D50: .032 D30: .019 D15: .010 D10: .0065 mm

Cu: 5.95 Cc: 1.47

Gravel: 0.0% Sand: 8.5% Fines: 91.5%

Comments

- VIBRA CORE SAMPLE TAKEN 4-10-90
 - VOLATILE SOLIDS = 1.3%
- Cannot classify soil without knowing type of fines.



T28

Core = 2.6'

*** Corps of Engineers - North Pacific Division Materials Laboratory ***

COLUMBIA/LOWER WILLAMETTE-RECON/O&M (90-SHM-186)

Boring: CR-VC Sample: 12B' Depth: -- Lab No.: 18610

Sieve Analysis

Hydrometer Analysis

Sieve	Grams Retained	Percent Passing
5 In.	0.00	100.0
2.5 In.	0.00	100.0
1.25 In.	0.00	100.0
5/8 In.	0.00	100.0
5/16 In.	0.00	100.0
No. 5	0.00	100.0
No. 10	0.00	100.0
Pan	101.60	0.0
No. 18	0.00	100.0
No. 35	0.00	100.0
No. 60	0.20	99.8
No. 120	2.50	97.5
No. 230	46.70	54.0
Pan	101.60	0.0

Time	Temp (C)	Hydrometer Reading	Diameter in mm	Percent Finer
1	20.0	35.2	0.0435	34.8
3	20.0	18.2	0.0282	18.2
10	20.0	10.2	0.0162	10.4
100	20.0	4.9	0.0068	5.3
200	20.0	3.9	0.0048	4.3

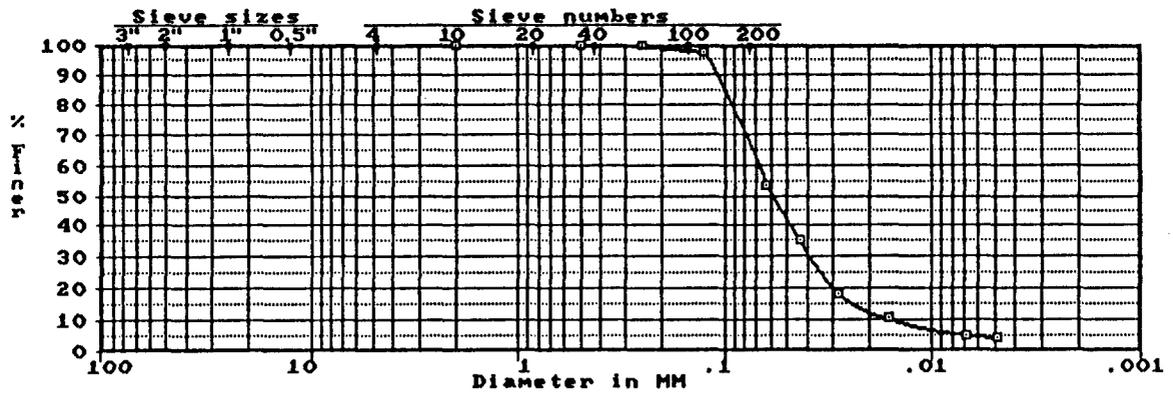
D85: .100 D60: .068 D50: .059 D30: .039 D15: .024 D10: .016 mm

Cu: 4.41 Cc: 1.44

Gravel: 0.0% Sand: 33.5% Fines: 66.5%

Comments

- VIBRA CORE SAMPLE
 - VOLATILE ORGANICS - 1.4%
- Cannot classify soil without knowing type of fines.



12B
 54% = 78%
 86.2% = 20%
 " all size
 63.0

Client: Battelle
 Contact: Eric Crecelius
 Project: PR101960
 ID number: CR-VC-10 +CR-VC-9
 Description:
 Sampled: / /
 Received: 06/26/90
 Matrix: Soil

Released by: *PK*

ANALYTICAL RESULTS

CAS Number	Analyte	Concentration	C	Prep	M
7440-38-2	Arsenic	1.50 mg/kg-dry		SWN	GFA
7440-43-9	Cadmium	0.09 mg/kg-dry		SWN	GFA
7440-47-3	Chromium	7.0 mg/kg-dry		SWC	ICP
7440-50-8	Copper	14.8 mg/kg-dry		SWC	ICP
7439-92-1	Lead	2.64 mg/kg-dry		SWN	GFA
7439-97-6	Mercury	0.03 mg/kg-dry	U	SCM	CVA
7440-02-0	Nickel	7 mg/kg-dry		SWC	ICP
7440-22-4	Silver	0.3 mg/kg-dry	U	SWC	ICP
7440-66-6	Zinc	33.7 mg/kg-dry		SWC	ICP

ORGANICS ANALYSIS DATA SHEET -Method 8080- PESTICIDE/PCB

Lab Sample ID: 6547 A
Matrix: Soil

Sample No.: CR-VC-10 & CR-VC-9

Data Release Authorized: *Peter M. Kepler*
DATA PREPARED: MAC:C (07/26/90) cpg

QC Report No.: 6547 - Battelle
Project: PR 121960
13 against BOA 37
VTSR: 06/26/90

Date Extracted: 07/05/90
Date Analyzed: 07/17/90
Conc/Dil Factor: 1:20
Dry Weight: 24.0 grams

GPC Cleanup: No
Alumina Cleanup: Yes

CAS Number		µg/kg
319-84-6	Alpha-BHC	3.0U
319-85-7	Beta-BHC	3.0U
319-86-8	Delta-BHC	5.0U
58-89-9	Gamma-BHC (Lindane)	3.0U
76-44-8	Heptachlor	3.0U
309-00-2	Aldrin	3.0U
1024-57-3	Heptachlor Epoxide	3.0U
959-98-8	Endosulfan I	3.0U
60-57-1	Dieldrin	6.0U
72-55-9	4,4'-DDE	6.0U
72-20-8	Endrin	6.0U
33212-65-9	Endosulfan II	6.0U
72-54-8	4,4'-DDD	6.0U
1031-07-8	Endosulfan Sulfate	12U
50-29-3	4,4'-DDT	6.0U
72-43-5	Methoxychlor	12U
53494-70-5	Endrin Ketone	9.0U
5103-74-2	Gamma-Chlordane	5.0U
5103-71-9	Alpha-Chlordane	5.0U
8001-35-2	Toxaphene	450U
-	Aroclor-1242/1016	50U
12672-29-6	Aroclor-1248	50U
11097-69-1	Aroclor-1254	50U
11096-82-5	Aroclor-1260	50U

Pesticide Surrogate Recovery	
Dibutylchlorodate	106%

Data Qualifiers

- U Indicates compound was analyzed for but not detected at the given detection limit.
J Indicates an estimated value when the result is less than the calculated detection limit.
NA Indicates not analyzed.

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Lab Sample ID: 6547 A
Matrix: Soil

Sample No: CR-VC-10 & CR-VC-9
QC Report No: 6547 - Battelle
Project: PR 12196D
13 Against BOA-37
VTSR: 06/26/90

Date Extracted: 7/5/90
Date Analyzed: 7/20/90
Dry 24.0 grams
Dilution: 1 to 2

Data Release Authorized: *[Signature]*
REPORT PREPARED: MAC:C - C.G., (07/26/90)

Reported In ppm (mg/kg)

CAS Number		mg/kg
91-20-3	Naphthalene	0.1 U
208-96-8	Acenaphthylene	0.1 U
83-32-9	Acenaphthene	0.1 U
86-73-7	Fluorene	0.1 U
85-01-8	Phenanthrene	0.1 U
120-12-7	Anthracene	0.1 U
206-44-0	Fluoranthene	0.1 U
129-00-0	Pyrene	0.1 U
56-55-5	Benzo(a)Anthracene	0.1 U
218-01-9	Chrysene	0.1 U
205-98-2	Benzo(b)Fluoranthene &	
207-08-9	Benzo(k)Fluoranthene	0.2 U
50-32-8	Benzo(a)Pyrene	0.2 U
193-39-8	Indeno(1,2,3-cd)Pyrene &	
53-70-8	Dibenz(a,h)Anthracene	0.2 U
191-24-2	Benzo(ghi)Perylene	0.2 U

SURROGATE PERCENT RECOVERY

Terphenyl	66%
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Data Qualifiers

- U Indicates compound was analyzed for but not detected at the given detection limit.
- NR Indicates compound not reported due to dilution and/or matrix interference.
- NA Indicates compound not analyzed.

Client: Battelle
 Contact: Eric Crecelius
 Project: PR101950
 ID number: CR-VC-12A +12B+11
 Description:
 Sampled: / /
 Received: 06/26/90
 Matrix: Soil

Released by: PK

ANALYTICAL RESULTS

CAS Number	Analyte	Concentration	C	Prep	M
7440-38-2	Arsenic	2.9 mg/kg-dry		SWN	GFA
7440-43-9	Cadmium	0.29 mg/kg-dry		SWN	GFA
7440-47-3	Chromium	7.7 mg/kg-dry		SWC	ICP
7440-50-8	Copper	23.4 mg/kg-dry		SWC	ICP
7439-92-1	Lead	2.5 mg/kg-dry		SWN	GFA
7439-97-6	Mercury	0.02 mg/kg-dry	U	SCN	CVA
7440-02-0	Nickel	8 mg/kg-dry		SWC	ICP
7440-22-4	Silver	0.3 mg/kg-dry	U	SWC	ICP
7440-66-6	Zinc	42.5 mg/kg-dry		SWC	ICP

ORGANICS ANALYSIS DATA SHEET- PNA by GC-FID

Lab Sample ID: 6547 B
Matrix: Soil

Sample No: CR-VC-12A & 12B & 11
QC Report No: 6547 - Battelle
Project: PR 121960
13 Against BOA-37
VTSR: 06/26/90

Date Extracted: 7/5/90
Date Analyzed: 7/20/90
Dry 26.9 grams
Dilution: 1 to 2

Data Release Authorized: *Peter M. Keyler*
REPORT PREPARED: MAC:C - C.G.. (07/26/90)

Reported in ppm (mg/kg)

CAS Number		mg/kg
91-20-3	Naphthalene	0.2 U
208-96-3	Acenaphthylene	0.1 U
83-32-9	Acenaphthene	0.1 U
86-73-7	Fluorene	0.1 U
85-01-8	Phenanthrene	0.1 U
120-12-7	Anthracene	0.1 U
206-44-0	Fluoranthene	0.1 U
129-00-0	Pyrene	0.1 U
56-55-3	Benzo(a)Anthracene	0.2 U
218-01-9	Chrysene	0.1 U
205-99-2	Benzo(b)Fluoranthene &	
207-08-9	Benzo(k)Fluoranthene	0.2 U
50-32-8	Benzo(a)Pyrene	0.2 U
193-39-5	Indeno(1,2,3-cd)Pyrene &	
53-70-3	Dibenz(a,h)Anthracene	0.3 U
191-24-2	Benzo(ghi)Perylene	0.2 U

SURROGATE PERCENT RECOVERY

Terphenyl	71%
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Data Qualifiers

- U Indicates compound was analyzed for but not detected at the given detection limit.
- NR Indicates compound not reported due to dilution and/or matrix interference.
- NA Indicates compound not analyzed.

ORGANICS ANALYSIS DATA SHEET -Method 8080- PESTICIDE/PCB

Lab Sample ID: 6547 B
Matrix: Soil

Sample No.: CR-VC-12A & 12B & 11

Data Release Authorized: *Peter D. Kaylor*
DATA PREPARED: MAC:C (07/26/90) cpg

QC Report No.: 6547 - Battelle
Project: PR 121960
13 against BOA 37
VTSR: 06/26/90

Date Extracted: 07/05/90
Date Analyzed: 07/17/90
Conc/Dil Factor: 1:20
Dry Weight: 26.9 grams

GPC Cleanup: No
Alumina Cleanup: Yes

CAS Number		µg/kg
319-84-6	Alpha-BHC	3.0U
319-85-7	Beta-BHC	3.0U
319-86-8	Delta-BHC	5.0U
58-89-9	Gamma-BHC (Lindane)	3.0U
76-44-8	Heptachlor	3.0U
309-00-2	Aldrin	3.0U
1024-57-3	Heptachlor Epoxide	3.0U
959-98-8	Endosulfan I	3.0U
60-57-1	Dieldrin	6.0U
72-55-9	4,4'-DDE	6.0U
72-20-8	Endrin	6.0U
33212-65-9	Endosulfan II	6.0U
72-54-8	4,4'-DDD	6.0U
1031-07-8	Endosulfan Sulfate	12U
50-29-3	4,4'-DDT	6.0U
72-43-5	Methoxychlor	12U
53494-70-5	Endrin Ketone	9.0U
5103-74-2	Gamma-Chlordane	5.0U
5103-71-9	Alpha-Chlordane	5.0U
8001-35-2	Toxaphene	450U
-	Aroclor-1242/1016	50U
12672-29-6	Aroclor-1248	50U
11097-69-1	Aroclor-1254	50U
11096-82-5	Aroclor-1260	50U

Pesticide Surrogate Recovery	
Dibutylchloridate	81%

Data Qualifiers

- U Indicates compound was analyzed for but not detected at the given detection limit.
J Indicates an estimated value when the result is less than the calculated detection limit.
NA Indicates not analyzed.

 TWIN CITY TESTING CORPORATION
 PCDF/PCDD ANALYSIS RESULTS

 Client....BATTELLE

Sample ID (Client's#)....CR-VC-12A+12B
 Sample ID (TCT#).....197193
 Analysis Date.....7/24/90
 Filename.....V00724G
 Analyst.....BB
 Sample Amount.....0.0080 kg
 ICAL Date.....6-15-90
 CCAL Filename.....V00724B

NATIVE ISOMERS	CONC. ng/kg	DL ng/kg	INTERNAL STANDARDS	ng/g ADDED	PERCENT RECOVERY
2378-TCDF	0.89	-----	2378-TCDF-C13	2.00	100
TOTAL TCDF	2.90	-----	2378-TCDD-C13	2.00	101
2378-TCDD	nd	0.42	12378-PeCDF-C13	2.00	83
TOTAL TCDD	0.42	-----	23478-PeCDF-C13	2.00	94
12378-PeCDF	0.24	-----	12378-PeCDD-C13	2.00	84
23478-PeCDF	nd	0.14	123478-HxCDF-C13	2.00	82
TOTAL PeCDF	2.20	-----	123678-HxCDF-C13	2.00	55
12378-PeCDD	0.18	-----	123789-HxCDF-C13	2.00	69
TOTAL PeCDD	0.48	-----	234678-HxCDF-C13	2.00	75
123478-HxCDF	0.48	-----	123478-HxCDD-C13	2.00	81
123678-HxCDF	0.33	-----	123678-HxCDD-C13	2.00	68
123789-HxCDF	0.37	-----	1234678-HpCDF-C13	2.00	52
234678-HxCDF	nd	0.14	1234789-HpCDF-C13	2.00	60
TOTAL HxCDF	3.90	-----	1234678-HpCDD-C13	4.00	49
123478-HxCDD	0.26	-----	OCDD-C13	2.00	38
123678-HxCDD	2.10	-----	1234-TCDD-C13	2.00	na
123789-HxCDD	0.77	-----	123789-HxCDD-C13	2.00	na
TOTAL HxCDD	11.00	-----	2378-TCDD-C137	0.80	102
1234678-HpCDF	1.80	-----			
1234789-HpCDF	nd	0.56			
TOTAL HpCDF	5.60	-----			
1234678-HpCDD	25.00	-----			
TOTAL HpCDD	46.00	-----			
OCDF	4.40	-----			
OCDD	220.00	-----			

Total 2378-TCDD
 Equivalence = 1.1186 ng/kg
 (Using EPA 8290 Factors)

CONC= Concentrations, calculated as described in EPA method 8290.
 DL= Detection limits, calculated as described in EPA method 8290.
 na= not applicable
 nd= not detected

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